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Technology in the Science Classroom

21st Century Learning Lab

December 14, 2010

21st Century Learning Lab

- Launched in September
- Topical Exploration of Educational Technology (Podcasts, Webinars, Blogs, LC Communities)
- Current topic—Technology in the Science Classroom
- Upcoming Topics
  - Educational Games
  - Assistive Technology
  - Copyright in the Information Age
- Subscribe to podcast and see updates in iTunes

21st Century Learning Lab

- Upcoming Webinar Dates
  - Educational Games – January 26th
  - Assistive Technology – February 23rd
  - Copyright in the Information Age – March 23rd
  - Technology in the Fine Arts Classroom – April 27th
  - Virtual and Online Learning – May 18th

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Technology in Science

December 15, 2010

Jennifer Hicks, Ph.D.
Science Curriculum Specialist
IDOE

Use of Technology in Science

- Technology allows students to:
  - Collect data in real time
  - Analyze data
  - Share information effectively with classmates and instructor
  - Ask more sophisticated questions

Use of Technology in Indiana

- Several grants were awarded to support the use of technology in science classrooms
  - Purchasing of probeware for middle school
  - Modeling instruction in Chemistry and Physics

Learning Connection Community

- Learning Connection
  - Science Educators Discussion Group https://learningconnection.doe.in.gov/UserGroup/GroupDetail.aspx?gid=520
  - Indiana Chemistry Modeling Instructors https://learningconnection.doe.in.gov/UserGroup/GroupDetail.aspx?gid=460
  - Indiana Physics Modeling Instructors https://learningconnection.doe.in.gov/UserGroup/GroupDetail.aspx?gid=464

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Ryan Bruick – High School Science Teacher

Noblesville High School

What We're Doing

- Using Moodle to supplement classroom learning.
  - Providing students with a variety of sources to promote investigation.
  - Moving new information and formal assessments out of the classroom.
  - Encouraging student collaboration.
  - Reducing time spent in class on procedural tasks.

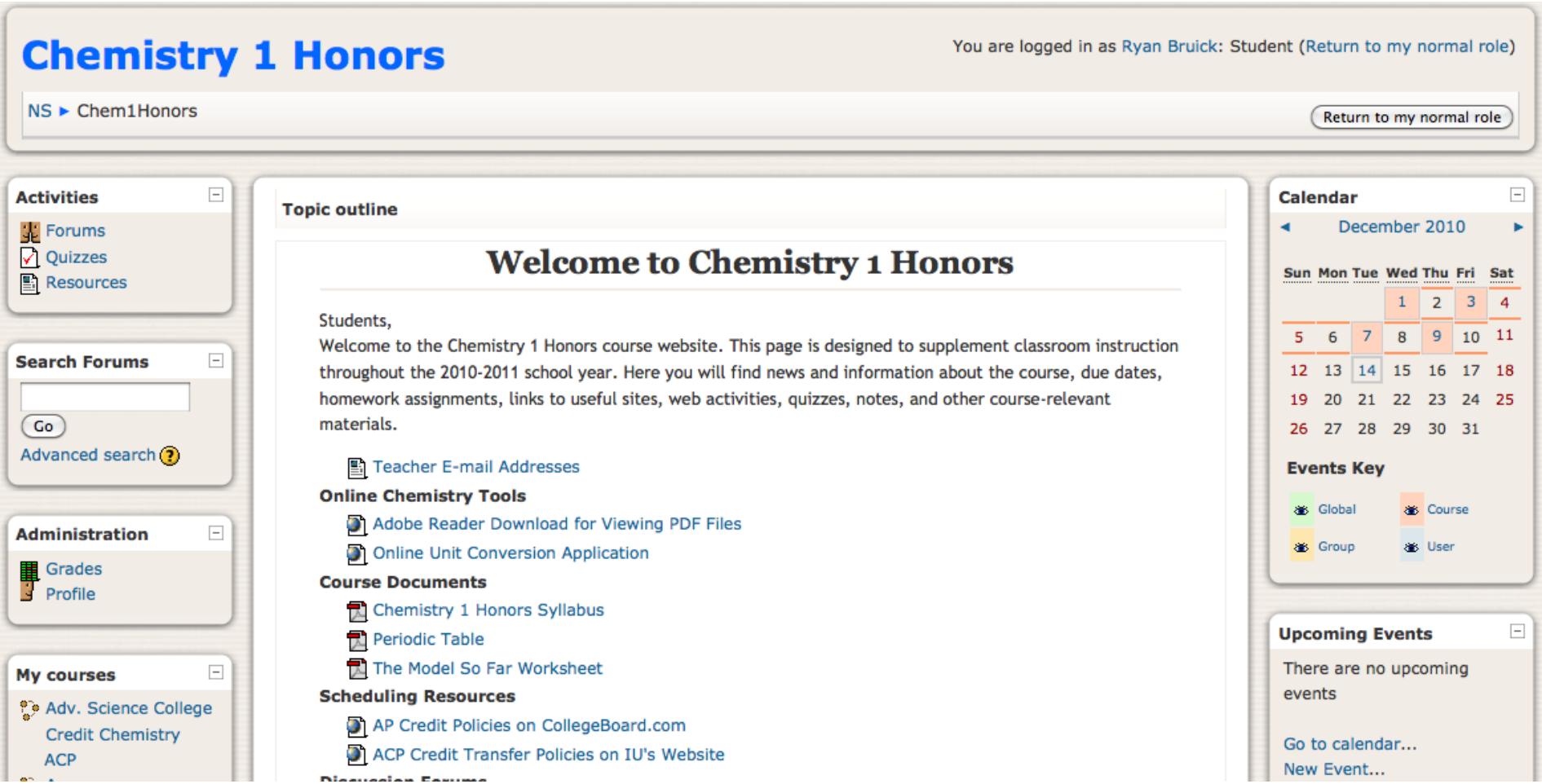
How We're Doing It

- Uploading notes ahead of class meetings.
- Combining textbook-style readings with relevant scholarly articles.
- Creating online "quizzes" to assess reading comprehension.
- Organizing forums for students to share questions, answers, and opinions.
- Posting announcements, homework, due dates, etc.

What is Moodle?

- moodle.com
  - Modular Object-Oriented Dynamic Learning Environment
- An "online learning environment" or "classroom management system".
  - Others exist, though some cost money.
- Very similar to systems used at universities and colleges such as Blackboard and Oncourse.
  - Students are better prepared for the transition to post-secondary education.

Course at a Glance



Example of a Unit

2

Unit 1 - Physical Properties of Matter

- Chemical Universe Article Discussion Notes

Mass and Change Lab

- Mass and Change Lab Data Sheet
- Mass and Change Lab Particle Diagrams

Measurements, Uncertainty, and Significant Figures

- Measurement Notes
- Reading Scales and SigFigs Worksheet
- SigFig and Measurement Questions

Mass, Volume, and Density

- Relating Mass to Volume Lab
- Relating Mass to Volume Lab Data (Class Averages)
- Relating Mass to Volume Post-Lab
- Unit 1 Wksht 3 - Mass, Volume, and Density
- Unit 1 Wksht 4 - Applied Density Problems, and Thickness of a Foil Lab

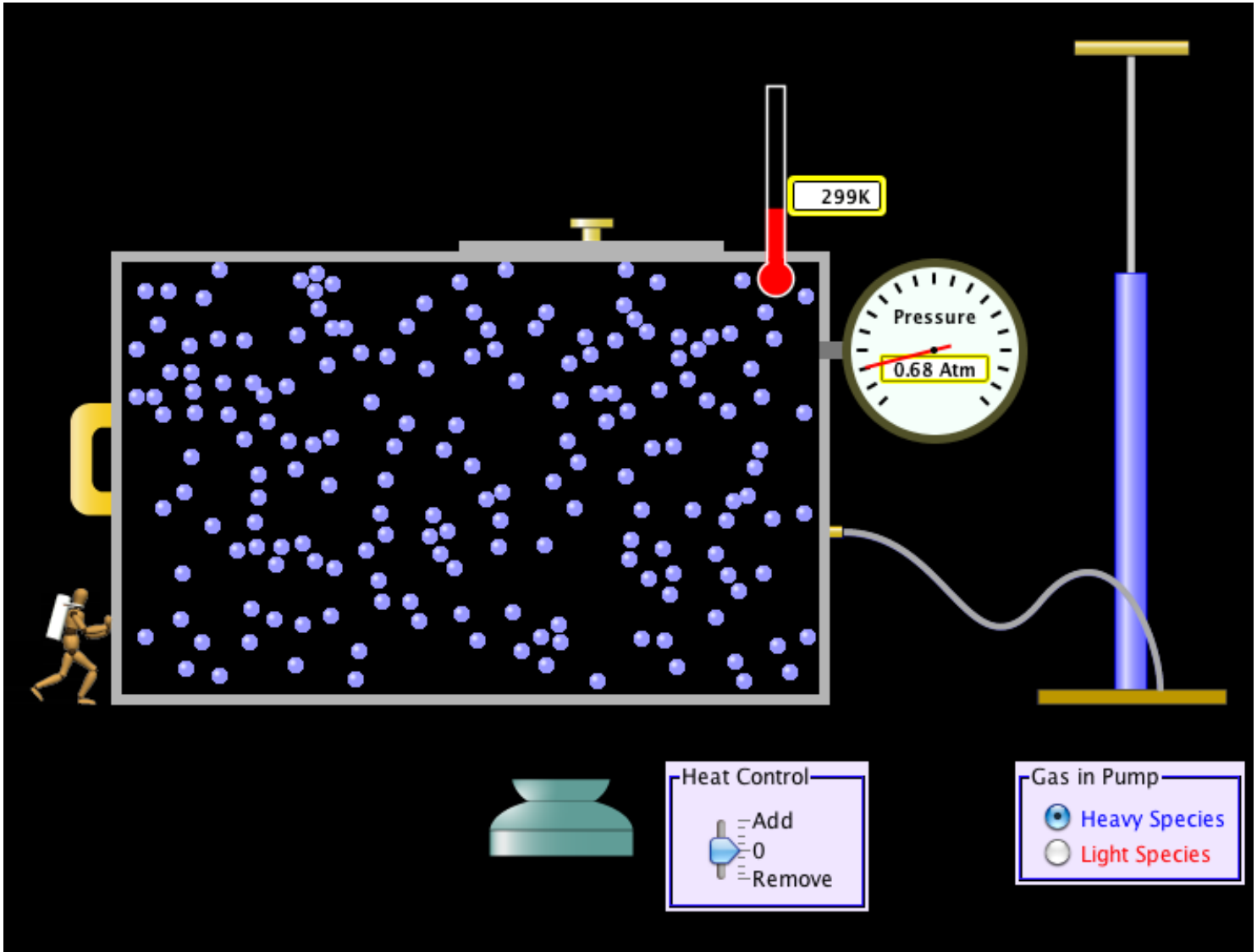
Metric Units, Conversions, and Dimensional Analysis

- Metric Conversion Notes and Table
- Unit 1 Wksht 6 - Dimensional Analysis
  - Online Unit Conversion Application
- Size of Things Web Activity - Website Link
  - Size of Things Web Activity - Worksheet 5
- Unit 1 Quiz 2 Review

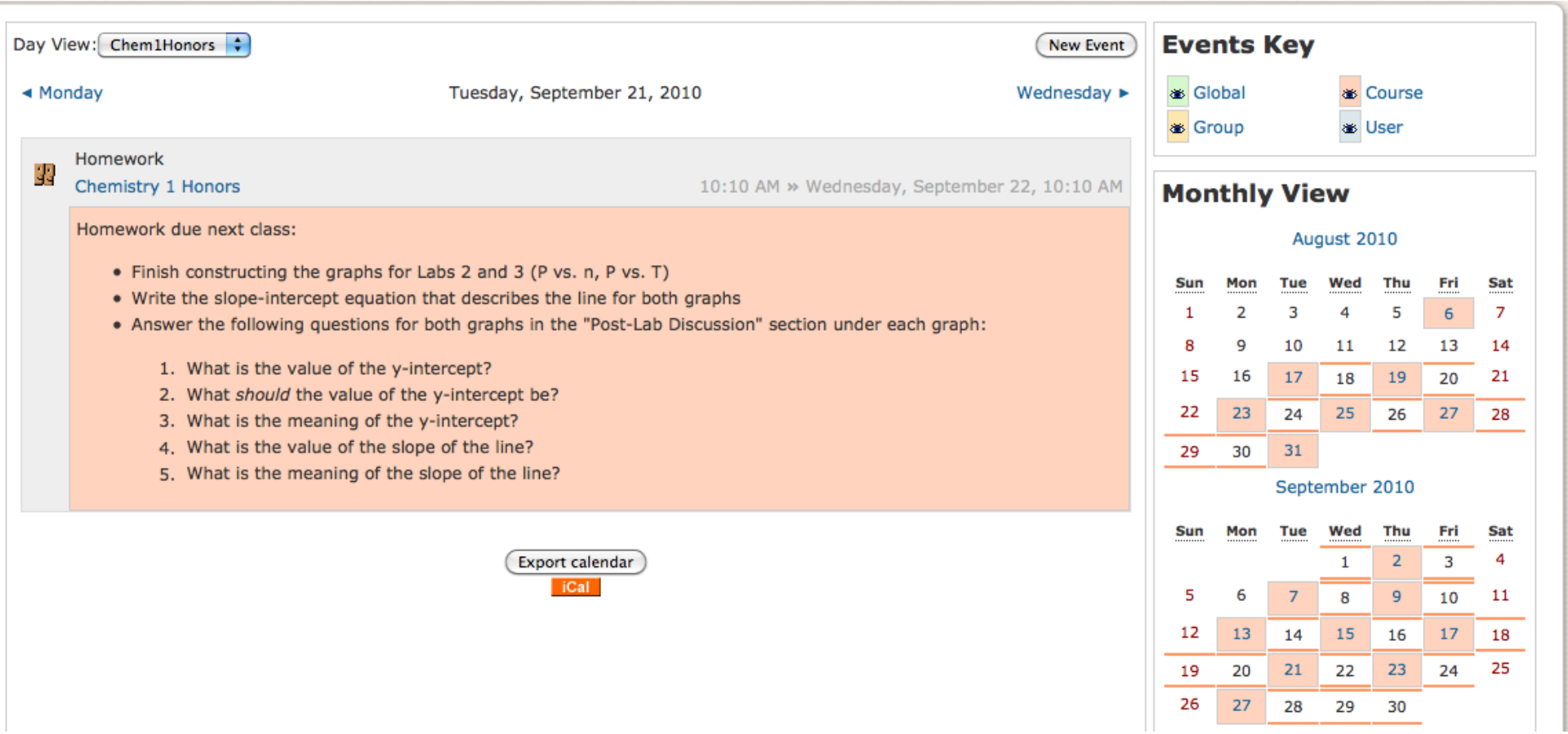
End of Unit Lab and Review

- Density of a Gas Lab
- Unit 1 Review
- The Model so Far Worksheet
- Unit 1 Model so Far

Links to Interactive Applets



Announcements



Day View: Chem1Honors

New Event

◄ Monday

Tuesday, September 21, 2010

Wednesday ►

Homework

Chemistry 1 Honors

10:10 AM » Wednesday, September 22, 10:10 AM

Homework due next class:

- Finish constructing the graphs for Labs 2 and 3 (P vs. n, P vs. T)
- Write the slope-intercept equation that describes the line for both graphs
- Answer the following questions for both graphs in the "Post-Lab Discussion" section under each graph:

1. What is the value of the y-intercept?
2. What *should* the value of the y-intercept be?
3. What is the meaning of the y-intercept?
4. What is the value of the slope of the line?
5. What is the meaning of the slope of the line?

Export calendar

iCal

Events Key

Global Course

Group User

Monthly View

August 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Discussion Forums

Re: Question

I understand that of the world's water supply only 3% is fresh water, but if 70% of the world is covered in water and the water never acutally leaves the Earth... can we really run out?

Show parent | Edit | Split | Delete | Reply

Re: Question

We all know that the amount of freshwater is very limited these days. Does this mean that the cost of water will eventually rise?

Show parent | Edit | Split | Delete | Reply

Re: Question

How long will it take for the world to use up all of the water that is now in the oceans?

Show parent | Edit | Split | Delete | Reply

Re: Question

I don't think that would even be possible considering evaporation and the water cycle. We will just continue to reuse the same water, it never disappears.

Show parent | Edit | Split | Delete | Reply

Re: Question

I want to know, why did it take so long for people to open their eyes and try to fix problems almost before it is too late? The article said something about the amount of water being an issue by 2025, but why does it always take drastic events for people to change the way they think and do things?

Our Results

- We've been able to explore the content in greater depth.
- Students are prepared with questions for next class – allows individualized pacing.
- Students are more familiar with reliable online sources.
- Students have the opportunity to be engaged in the science classroom beyond the 225 minutes per week we see them.

Our Results

- The time we have with our students in the classroom is preserved for those things we cannot replicate in an online environment.
  - Labs and activities.
  - Students presenting and defending solutions.
  - Individualized instruction.
  - Flexibility to discuss what the students find interesting and important.

What's Next?

- Replacing traditional texts with enriched online readings.
- Incorporation of formative assessment tools.
  - CALM
- Podcasting.
- Creating chat rooms to facilitate discussion outside the classroom.
- No more textbooks, no more paper.
  - Google Apps Webinar Series starts Jan. 11, 2011.
    - Sponsored by IDOE and ICE

Contact me via The Learning Connection

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- Rhonda Jennings – George Washington Community School Science Teacher
- Christine Strattman – Indianapolis Public Schools Science/Technology Grant Facilitator

What We're Doing

- Four IPS high schools and 2 non-public high schools are participating in the Enhancing Education Through Technology Grant
- Problem-Based Learning
- Technology
- IPS Online
- Professional Development

How We're Doing It

Our Results

- Higher level of student engagement
- Higher level of conceptual understanding
- Mastery of NET Standards
- Confident with 21st Century Skills
- Increased scores on assessments
- Better, quicker means of communication between students, parents and teachers
- Improvement in attendance
- Fewer behavior problems

What's Next?

- Grant participants will become leaders/trainers to assist in implementation of the IPS Strategic Plan, which includes PBL and technology benchmarks
- Move towards multi-disciplinary Project-Based Learning model
- Build more community partnerships

Questions?

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